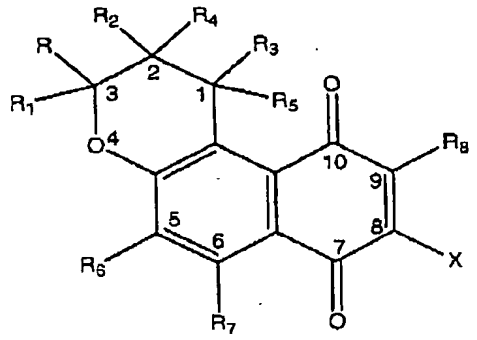
CLAIMS

1. A method of treatment or prophylaxis of hepatitis B virus in a subject comprising administering to said subject an effective amount of a compound of formula (1) or a pharmaceutically acceptable derivative, salt or prodrug thereof:



(1)

wherein X is OH, OR_9 or halo;

R and R_1 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, or together with the carbon atom to which they are attached form a saturated or unsaturated C_{3-6}carbocyclic ring;

R_2 and R_3 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl or together with the bond between the carbon atoms to which they are attached form a double bond;

R_4 and R_5 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH, OR_9, halo or $NR_{10}R_{10}$ or together with the bond between the carbon atoms to which they are attached form a double bond;

R_6 and R_7 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH or OR_9;

R_8 is independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH, OR_9 or halo;

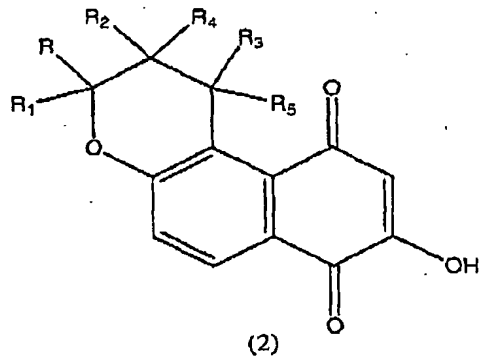
R_9 is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, $C(=O)R_{11}$ or $S(O)_2R_{12}$ or OR_9 is an amino acid residue;

each R_{10} is independently selected from H and C_{1-6}alkyl;

R_{11} is C_{1-21}alkyl, C_{2-21}alkenyl, C_{2-21}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkylC_{1-6}alkyl, aryl or arylC_{1-6}alkyl; and

R_{12} is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl or aryl.

2. A method according to claim 1 wherein the compound of formula (1) is a compound of formula (2):



(2)

R and R_1 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, or together with the carbon atom to which they are attached form a saturated or unsaturated C_{3-6}carbocyclic ring;

R_2 and R_3 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl or together with the bond between the carbon atoms to which they are attached form a double bond;

R_4 and R_5 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH, OR_9, halo or $NR_{10}R_{10}$ or together with the bond between the carbon atoms to which they are attached form a double bond;

R_9 is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, $C(=O)R_{11}$ or $S(O)_2R_{12}$ or OR_9 is an amino acid residue;

each R_{10} is independently selected from H and C_{1-6}alkyl;

R_{11} is C_{1-21}alkyl, C_{2-21}alkenyl, C_{2-21}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkylC_{1-6}alkyl, aryl or arylC_{1-6}alkyl; and

R_{12} is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl or aryl.

3. The method of claim 1 wherein the compound of formula (1) is selected from the group consisting of:

8-hydroxy-3,3-dimethyl-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,

8-hydroxy-3,3-dimethyl-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,

9-bromo-8-hydroxy-3,3-dimethyl-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,

9-bromo-8-hydroxy-3,3-dimethyl-3H-naphtho[2,1-*b*]pyran-7,10-dione,

9-bromo-3,3-dimethyl-8-(4-methylbenzenesulfonyloxy)-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,

9-bromo-3,3-dimethyl-8-(4-methylbenzenesulfonyloxy)-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,

8-acetoxy-3,3-dimethyl-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,

2,9-dibromo-1,8-dihydroxy-3,3-dimethyl-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,

8,9-dichloro-3,3-dimethyl-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,

7,8,10-triacetoxy-3,3-dimethyl-3*H*-naphtho[2,1-b]pyran,

9-Bromo-8-hydroxy-3,3-dimethyl-3*H*-naphtho[2,1-*b*]pyran-7,10-dione.

9-Bromo-8-hydroxy-3,3-dimethyl-3*H*-naphtho[2,1-*b*]pyran-7,10-dione.

9-Bromo-3,3-dimethyl-8-(4-methylbenzenesulfonyloxy)-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione.

9-Bromo-3,3-dimethyl-8-(4-methylbenzenesulfonyloxy)-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,

8-Bromo-3,3-dimethyl-9-(4-methylbenzenesulfonyloxy)-3*H*-naphtho[2,1-*b*]pyran-7,10-dione.

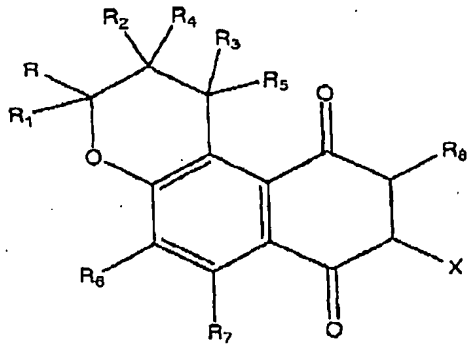
8-Bromo-3,3-dimethyl-9-(4-methylbenzenesulfonyloxy)-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,

8,9-Dichloro-3,3-dimethyl -1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,

Sodium 3,3-dimethyl-7,10-dioxo-7,10-dihydro-3*H*-benzo[*f*]chromen-8-olate;
Sodium 3,3-dimethyl-7,8-dioxo-7,8-dihydro-3*H*-benzo[*f*]chromen-10-olate
8-Hydroxy-3-methyl-3-phenyl-3H-benzo[*f*]chromene-7,10-dione, and
8-Hydroxy-3,3-diphenyl-3*H*-benzo[*f*]chromene-7,10-dione.

4. A method according to claim 1 wherein the compound of formula (1) is selected from the group consisting of:
8-hydroxy-3,3-dimethyl-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
8-hydroxy-3,3-dimethyl-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione).

5. The method of claim 1 wherein the compound of formula (1) is a compound of formula (3):



(3)

wherein X is OH, OR_9 or halo
R and R_1 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, or together with the carbon atom to which they are attached form a saturated or unsaturated C_{3-6}carbocyclic ring;
R_2 and R_3 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl or together with the bond between the carbon atoms to which they are attached form a double bond;

R_4 is selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, halo or $NR_{10}R_{10}$ or together with R_5 and the bond between the carbon atoms to which R_4 and R_5 are attached, form a double bond;

R_5 is selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH, OR_9, halo or $NR_{10}R_{10}$ or together with R_4 and the bond between the carbon atoms to which R_4 and R_5 are attached, form a double bond;

R_6 and R_7 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH or OR_8;

R_8 is independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH, OR_9 or halo;

R_9 is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, $C(=O)R_{11}$ or $S(O)_2R_{12}$ or OR_9 is an amino acid residue;

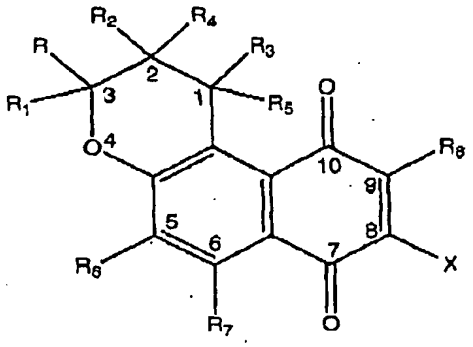
each R_{10} is independently selected from H and C_{1-6}alkyl;

R_{11} is C_{1-21}alkyl, C_{2-21}alkenyl, C_{2-21}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkylC_{1-6}alkyl, aryl or arylC_{1-6}alkyl; and

R_{12} is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl or aryl.

6. A method according to any one of claims 1 to 5 further comprising administering a second therapeutic agent.

7. A compound of Formula (1) or a pharmaceutically acceptable derivative, salt or prodrug thereof:



(1)

wherein X is OH, OR_9 or halo;

R and R_1 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, or together with the carbon atom to which they are attached form a saturated or unsaturated C_{3-6}carbocyclic ring;

R_2 and R_3 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl or together with the bond between the carbon atoms to which they are attached form a double bond;

R_4 and R_5 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH, OR_9, halo or $NR_{10}R_{10}$ or together with the bond between the carbon atoms to which they are attached form a double bond;

R_9 is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, $C(=O)R_{11}$ or $S(O)_2R_{12}$ or OR_9 is an amino acid residue;

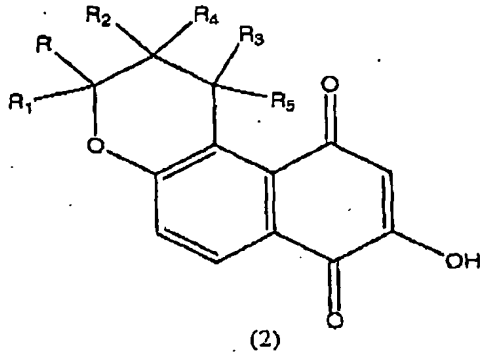
each R_{10} is independently selected from H and C_{1-6}alkyl;

R_{11} is C_{1-21}alkyl, C_{2-21}alkenyl, C_{2-21}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkylC_{1-6}alkyl, aryl or arylC_{1-6}alkyl; and

R_{12} is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl or aryl;

with the proviso that when R and R_1 are both methyl and R is OH or OR_9, R_5 is not selected from OH, OR_9 or NHR_9.

8. A compound according to claim 7 wherein the compound of Formula (1) is a compound of formula (2):



(2)

R and R_1 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, or together with the carbon atom to which they are attached form a saturated or unsaturated C_{3-6}carbocyclic ring;

R_2 and R_3 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl or together with the bond between the carbon atoms to which they are attached form a double bond;

R_4 and R_5 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH, OR_9, halo or $NR_{10}R_{10}$ or together with the bond between the carbon atoms to which they are attached form a double bond;

R_6 and R_7 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH or OR_9;

R_8 is independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH, OR_9 or halo;

R_9 is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, $C(=O)R_{11}$ or $S(O)_2R_{12}$ or OR_9 is an amino acid residue;

each R_{10} is independently selected from H and C_{1-6}alkyl;

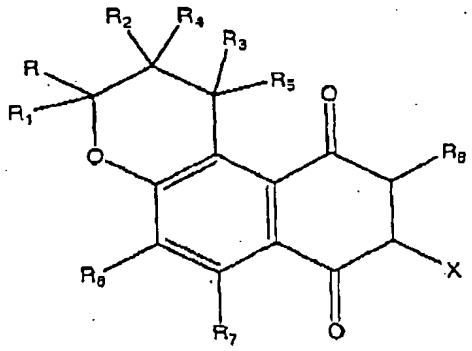
R_{11} is C_{1-21}alkyl, C_{2-21}alkenyl, C_{2-21}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkylC_{1-6}alkyl, aryl or arylC_{1-6}alkyl; and

R_{12} is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl or aryl.

9. A compound according to claim 7 wherein the compound of formula (1) is selected from the group consisting of:
8-hydroxy-3,3-dimethyl-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
8-hydroxy-3,3-dimethyl-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
9-bromo-8-hydroxy-3,3-dimethyl-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
9-bromo-8-hydroxy-3,3-dimethyl-3H-naphtho[2,1-*b*]pyran-7,10-dione,
9-bromo-3,3-dimethyl-8-(4-methylbenzenesulfonyloxy)-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
9-bromo-3,3-dimethyl-8-(4-methylbenzenesulfonyloxy)-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
8-acetoxy-3,3-dimethyl-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
2,9-dibromo-1,8-dihydroxy-3,3-dimethyl-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
8,9-dichloro-3,3-dimethyl-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
7,8,10-triacetoxy-3,3-dimethyl-3*H*-naphtho[2,1-b]pyran,
9-Bromo-8-hydroxy-3,3-dimethyl-3*H*-naphtho[2,1-*b*]pyran-7,10-dione.
9-Bromo-8-hydroxy-3,3-dimethyl-3*H*-naphtho[2,1-*b*]pyran-7,10-dione.
9-Bromo-3,3-dimethyl-8-(4-methylbenzenesulfonyloxy)-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione.
9-Bromo-3,3-dimethyl-8-(4-methylbenzenesulfonyloxy)-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
8-Bromo-3,3-dimethyl-9-(4-methylbenzenesulfonyloxy)-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
8-Bromo-3,3-dimethyl-9-(4-methylbenzenesulfonyloxy)-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
8,9-Dichloro-3,3-dimethyl -1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
Sodium 3,3-dimethyl-7,10-dioxo-7,10-dihydro-3*H*-benzo[*f*]chromen-8-olate;
Sodium 3,3-dimethyl-7,8-dioxo-7,8-dihydro-3*H*-benzo[*f*]chromen-10-olate;
8-Hydroxy-3-methyl-3-phenyl-3H-benzo[*f*]chromene-7,10-dione, and
8-Hydroxy-3,3-diphenyl-3*H*-benzo[*f*]chromene-7,10-dione.

10. A compound according to claim 7 wherein the compound of formula (1) is selected from the group consisting of:
8-hydroxy-3,3-dimethyl-3*H*-naphtho[2,1-*b*]pyran-7,10-dione,
8-hydroxy-3,3-dimethyl-1,2-dihydro-3*H*-naphtho[2,1-*b*]pyran-7,10-dione).

11. The compound of claim 7 wherein the compound of formula (1) is a compound of formula (3):



(3)

wherein X is OH, OR_9 or halo

R and R_1 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, or together with the carbon atom to which they are attached form a saturated or unsaturated C_{3-6}carbocyclic ring;

R_2 and R_3 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl or together with the bond between the carbon atoms to which they are attached form a double bond;

R_4 is selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, halo or $NR_{10}R_{10}$ or together with R_5 and the bond between the carbon atoms to which R_4 and R_5 are attached, form a double bond;

R_5 is selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH, OR_9, halo or $NR_{10}R_{10}$ or together with R_4 and the bond between the carbon atoms to which R_4 and R_5 are attached, form a double bond;

R_6 and R_7 are independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH or OR_9;

R_8 is independently selected from H, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, OH, OR_9 or halo;

R_9 is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, aryl, $C(=O)R_{11}$ or $S(O)_2R_{12}$ or OR_9 is an amino acid residue;

each R_{10} is independently selected from H and C_{1-6}alkyl;

R_{11} is C_{1-21}alkyl, C_{2-21}alkenyl, C_{2-21}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkylC_{1-6}alkyl, aryl or arylC_{1-6}alkyl; and

R_{12} is C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl or aryl.

12. A pharmaceutical composition comprising a compound according to any one of claims 7 to 11 and a pharmaceutically acceptable carrier, diluent or excipient.